IN THE CLAIMS:

The text of all pending claims are set forth below. Cancelled and withdrawn claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (previously presented), (cancelled), (withdrawn), (new), (not entered), (reinstated - formerly claim #), (previously reinstated), (re-presented - formerly dependent claim #) or, (previously re-presented).

Please AMEND claims 1, 6, 8-9, 17-21 and 27 in accordance with the following:

1. (CURRENTLY AMENDED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a collision detection unit detecting a collision of the piston with the valve due to operations of the linear compressor by comparing a peak amplitude of the piston with a preset reference value, and comprising a peak detection unit detecting a peak of an output signal corresponding to the peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on the output signal from the collision detection unit, and resetting maximum amplitude data of the piston of the linear compressor to reset the preset reference value according to the detected peak of the output signal when the collision occurs; and

a compressor driving unit controlling a maximum amplitude of the piston of the linear compressor under a control of the control unit.

2. (PREVIOUSLY PRESENTED) The apparatus according to claim 1, further comprising:

a first storage unit storing preset maximum amplitude data; and

a second storage unit storing reset maximum amplitude data from the control unit, the second storage unit being a non-volatile memory to read/write data.

3. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor, comprising:

a collision detection unit detecting a collision of a piston with a valve due to operations of the linear compressor;

a control unit determining whether the collision of the piston occurs based on an output signal from the collision detection unit, and resetting maximum amplitude data of the piston of the linear compressor when the collision occurs; and

a compressor driving unit controlling a maximum amplitude of the piston of the linear compressor under a control of the control unit,

wherein the collision detection unit includes:

a bridge unit having first and second coils serially connected to a ground, and first and second resistors connected in parallel with the first and second coils and serially connected to each other;

a core linearly reciprocating by penetrating the first and second coils according to a movement of the piston of the linear compressor and made of a magnetic substance;

a sine wave generating unit providing a sine wave to the first resistor and the first coil;

first and second half-wave rectifying units, each comprising a diode half-wave rectifying an output signal from a junction of the first and second resistors, and an output signal from the junction of the first and second coils, respectively;

a differential amplifying unit differentially amplifying output signals from the first and second half-wave rectifying units;

a low pass filter removing a high frequency component of an output signal from the differential amplifying unit; and

a peak detection unit detecting a peak of an output signal from the low pass filter, and outputting a detected result to the control unit.

4. (PREVIOUSLY PRESENTED) The apparatus according to claim 3, wherein the peak detection unit includes:

a diode half-wave rectifying the output signal from the low pass filter;

a third resistor serially connected to an output terminal of the diode;

a capacitor connected between an output side of the third resistor and ground to perform a smoothing operation; and

a fourth resistor connected between the output terminal of the diode and the ground.

5. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor with a core, comprising:

a collision detection unit detecting a collision of a piston with a valve due to operations of the linear compressor;

a control unit determining whether the collision of the piston occurs based on an output signal from the collision detection unit, and resetting maximum amplitude data of the piston of the linear compressor when the collision occurs;

a compressor driving unit controlling a maximum amplitude of the piston of the linear compressor under a control of the control unit;

a differential amplifying unit differentially amplifying output signals according to a detected position of the core;

an amplitude calculation unit calculating an amplitude of the piston based on an output signal from the differential amplifying unit, and providing the calculated amplitude to the control unit; and

a displacement calculation unit calculating a displacement of the piston according to a calculation result from the amplitude calculation unit, and providing the calculated displacement to the control unit.

6. (CURRENTLY AMENDED) A method of controlling a linear compressor, comprising:

presetting a maximum amplitude reference value of a piston of the linear compressor by an electronic control;

detecting a peak of a signal corresponding to ~~the~~a maximum amplitude of the piston when the linear compressor operates;

determining whether any collision of the piston has occurred by comparing a signal corresponding to the preset maximum amplitude reference value of the piston and the detected signal;

resetting the preset maximum amplitude reference value of the piston according to the detected peak of the signal if a collision of the piston is determined to have occurred at the determining; and

driving the linear compressor according to a reset maximum amplitude reference value.

7. (PREVIOUSLY PRESENTED) A method of controlling a linear compressor, comprising:

presetting a maximum amplitude of a piston of the linear compressor by an electronic control;

detecting a signal when the linear compressor operates;

determining whether any collision of the piston has occurred based on the detected signal;

resetting the maximum amplitude of the piston if a collision of the piston is determined to have occurred at the determining; and

driving the linear compressor according to a reset maximum amplitude of the piston,

wherein the maximum amplitude of the piston is reset by subtracting a value corresponding to the preset maximum amplitude of the piston from a value corresponding to a maximum amplitude of the piston when the collision is determined to have occurred so as to prevent a further collision of the piston.

8. (CURRENTLY AMENDED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detection unit detecting a collision of the piston with the valve during operation of the linear compressor according to at least a peak amplitude of the piston, and comprising a peak detection unit detecting a peak of an output signal corresponding to the peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on an output signal from the detection unit, and resetting maximum amplitude data of the piston of the linear compressor to reset a maximum amplitude reference value according to the detected peak of the output signal when the collision occurs; and

a compressor driving unit controlling a maximum amplitude of the piston according to ~~output signals from the control~~the reset maximum amplitude reference value.

9. (CURRENTLY AMENDED) The apparatus according to claim 8, further comprising:

first and second storage units to store a preset amplitude value reference and ~~a~~the reset amplitude reference value, respectively, when the collision is determined by the control unit.

10. (PREVIOUSLY PRESENTED) The apparatus according to claim 9, wherein at least the second storage unit is a non-volatile memory to read data from and write data to the control unit.

11. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detection unit detecting a collision of the piston with the valve during operation of the linear compressor according to at least a peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on an output signal from the detection unit, and resetting maximum amplitude data of the piston of the linear compressor when the collision occurs; and

a compressor driving unit controlling a maximum amplitude of the piston according to output signals from the control,

wherein the detection unit comprises

a bridge circuit having first and second coils serially connected at respective first terminals of the first and second coils, and first and second resistors connected in parallel with the first and second coils and serially connected to each other at respective first terminals of the first and second resistors,

a core linearly reciprocating by penetrating the first and second coils, a position of the core corresponding to a position of the piston of the linear compressor and magnetically coupling with the first and second coils,

a sine wave generating unit energizing the bridge circuit at second terminals of the first and second coils, respectively,

first and second rectifying units connected to the respective first terminals of the first and second coils and the respective first terminals of the first and second resistors, respectively to rectify output signals thereof,

a differential amplifying unit differentially amplifying output signals from the first and second rectifying units,

a low pass filter removing a high frequency component of an output signal from the differential amplifying unit, and

a peak detection unit detecting a peak of an output signal from the low pass filter, and outputting a detected result to the control unit.

12. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detection unit detecting a collision of the piston with the valve during operation of the linear compressor according to at least a peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on an output signal from the detection unit, and resetting maximum amplitude data of the piston of the linear compressor when the collision occurs; and

a compressor driving unit controlling a maximum amplitude of the piston according to output signals from the control,

wherein the detection unit comprises

a position detection circuit detecting a position of a core by a differential signal provided by first and second coils when the core is linearly reciprocating by penetrating the first and second coils and the first and second coils are excited by an external source,

a low pass filter removing a high frequency component of the differential signal, and

a peak detection unit detecting a peak of the differential signal output from the low pass filter, and outputting a detected result to the control unit.

13. (PREVIOUSLY PRESENTED) The apparatus according to claim 12, wherein the peak detection unit comprises:

a diode rectifying the output signal from the low pass filter;

a resistor serially connected between an output terminal of the diode and an output of the peak detection unit;

a capacitor connected between an output side of the resistor and a first voltage level to smooth the output of the peak detection unit; and

a second resistor connected between the output terminal of the diode and the first voltage level.

14. (PREVIOUSLY PRESENTED) The apparatus according to claim 12, wherein the position detection circuit produces the differential signal proportional to a change in the position of the core by magnetic coupling between the core and each of the first and second coils.

15. (PREVIOUSLY PRESENTED) The apparatus according to claim 8, wherein the detection unit comprises:

a differential amplifying unit differentially amplifying output signals, the output signals corresponding to a detected position of the piston;

an amplitude calculation unit calculating an amplitude of the piston based on an output signal from the differential amplifying unit, and providing the calculated amplitude to the control unit; and

a displacement calculation unit calculating a displacement of the piston according to a calculation result from the amplitude calculation unit, and providing the calculated displacement to the control unit.

16. (PREVIOUSLY PRESENTED) The apparatus according to claim 15, wherein the control unit prevents the collision of the piston with the valve, and controls the displacement of the piston and/or amplitude of the piston by results of the detection unit.

17. (CURRENTLY AMENDED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detector to detect a peak amplitude of the piston, and comprising a peak detection unit detecting a peak of an output signal corresponding to the peak amplitude of the piston;

a control unit determining whether a collision of the piston and valve occurs according to the peak amplitude of the piston detected by the detector, and resetting maximum amplitude data of the piston to reset a maximum amplitude reference value according to the detected peak of the output signal when the collision is determined; and

a driving unit driving the piston according to the calculated amplitude and displacement of the piston.

18. (CURRENTLY AMENDED) A method of controlling a linear compressor, comprising:

setting a maximum amplitude reference value of a piston of the linear compressor;

driving the linear compressor according to a set maximum amplitude reference value;

detecting a peak of a signal corresponding to the maximum amplitude of the piston;

determining whether any collision of the piston has occurred by comparing a signal corresponding to the set maximum amplitude reference value and the detected signal;

resetting the maximum amplitude reference value of the piston according to the detected peak of the signal if the collision of the piston is determined to have occurred at the determining; and

driving the linear compressor according to a reset maximum amplitude reference value to prevent the collision of the piston.

19. (CURRENTLY AMENDED) The method according to claim 18, wherein the resetting of the maximum amplitude comprises:

subtracting a value corresponding to the set maximum amplitude of the piston from a value corresponding to a maximum amplitude of the piston when the collision is determined to have ~~occured~~ occurred so as to prevent a further collision of the piston.

20. (CURRENTLY AMENDED) A method of controlling a linear compressor with a piston, a valve and a control unit, comprising:

detecting a collision of the piston with the valve according to at least a peak amplitude of the piston by detecting a peak of a signal corresponding to the peak amplitude of the piston;

determining whether the collision of the piston occurs based on at least the peak amplitude of the piston, and resetting maximum amplitude data of the piston of the linear compressor to reset an amplitude reference value ~~of the piston~~ according to the detected peak of the signal when the collision occurs;

controlling a peak amplitude of the piston according to collision results of the piston.

21. (CURRENTLY AMENDED) The method according to claim 20, further comprising:

storing a set amplitude reference value by electronic control and ~~a~~the reset amplitude reference value when the collision is determined.

22. (PREVIOUSLY PRESENTED) A method of controlling a linear compressor with a piston, a valve and a control unit, comprising:

detecting a collision of the piston with the valve according to at least a peak amplitude of the piston;

determining whether the collision of the piston occurs based on at least the peak amplitude of the piston, and resetting maximum amplitude data of the piston of the linear compressor when the collision occurs; and

controlling a maximum amplitude of the piston according to collision results of the piston, wherein the detecting comprises:

detecting a position of a core by a differential signal provided by first and second coils when the core is linearly reciprocating by penetrating the first and second coils and the first and second coils are excited by an external source,

removing a high frequency component of the differential signal,

detecting a peak of the differential signal after the high frequency component is removed, and

outputting a detected result to the control unit.

23. (PREVIOUSLY PRESENTED) The method according to claim 22, wherein the detecting of the peak comprises:

rectifying the differential signal after the high frequency component is removed; and

smoothing the rectified differential signal.

24. (PREVIOUSLY PRESENTED) The method according to claim 22, wherein the detecting produces the differential signal proportional to a change in the position of the core by a magnetic coupling between the core and each of the first and second coils.

25. (PREVIOUSLY PRESENTED) The method according to claim 24, wherein the detecting comprises:

differentially amplifying output signals according to a detected position of the core;

calculating an amplitude of the piston based on the differentially amplified output signals;

calculating a displacement of the piston according to the calculating of the amplitude; and

outputting the calculated amplitude and the calculated displacement.

26 . (PREVIOUSLY PRESENTED) The method according to claim 25, further comprising:

preventing the collision of the piston with the valve by controlling the displacement of the piston and/or the amplitude of the piston by results of the detecting of the position of the core.

27. (CURRENTLY AMENDED) A method of controlling a linear compressor with a piston and a valve, comprising:

setting a maximum amplitude reference value of the piston;

detecting a peak amplitude of the piston by detecting a peak of a signal corresponding to a maximum amplitude of the piston;

determining whether a collision of the piston and the valve occurs according to the detected peak amplitude of the piston; and

resetting a maximum amplitude reference value of the piston according to the detected peak of the signal when the collision is determined; and

driving the piston according to the collision results of the piston.